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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,549	01/30/2006	Kazuhiko Fukutani	03500.102994.	7631

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FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER
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SINES, BRIAN J

ART UNIT	PAPER NUMBER
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1743

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/530,549

**Applicant(s)**

FUKUTANI ET AL.

**Examiner**

Brian J. Sines

**Art Unit**

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 6 – 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 6 recites the limitation "pores" in lines 2 and 3. There is insufficient antecedent basis for this limitation in the claim.

b. Claim 7 recites the limitation "pores" in line 2. There is insufficient antecedent basis for this limitation in the claim.

c. Claim 9 recites the limitation "detection material" in line 2. There is insufficient antecedent basis for this limitation in the claim.

2. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are:

Regarding claim 10, it is unclear as to how the field effect sensor would be used as a sensor. For example, claim 1 does not positively recite a sensing structure or material that would be used as a sensor. With respect to claims 1 and 10, what recited structure would function as the sensing portion of the claimed device? In claims drawn to an apparatus statutory class of invention, the structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a

complete operative device (See MPEP § 2172.01). Furthermore, with respect to features deemed critical to the functioning of the invention in the intended manner, would the sensor require the incorporation of an immobilized chemical to facilitate the specific detection of a certain biomolecule (see, e.g., Applicant's specification, p. 15)? A feature that is taught as critical in the specification should be recited in the claims (see MPEP § 2164.08c).

***Claim Rejections - 35 USC § 102***

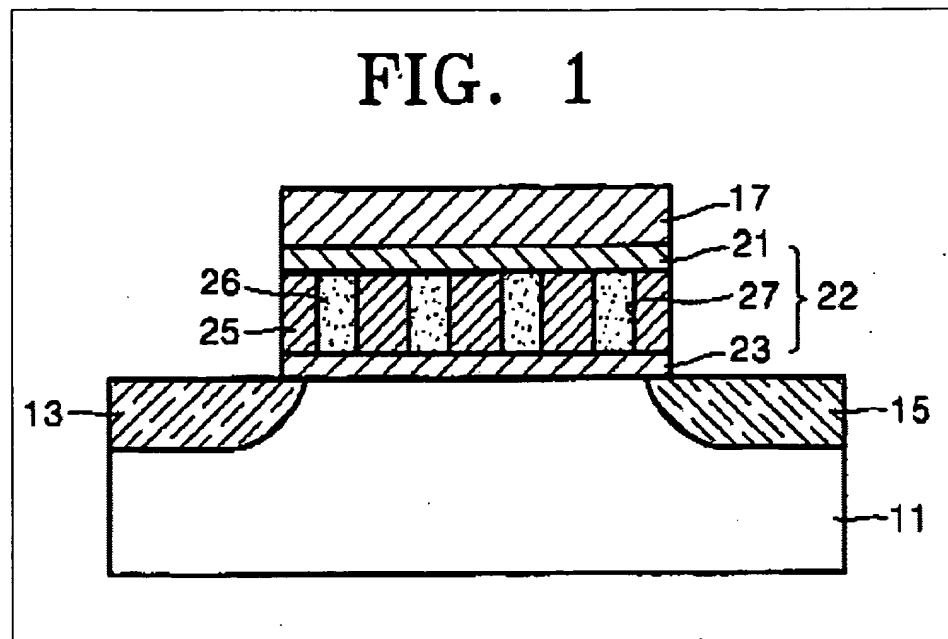
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 3, 7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Choi et al. (U.S. Pat. No. 6,949,793 B2) (hereinafter "Choi").

Regarding claim 1, Choi teaches a field effect transistor device comprising: a substrate 11 comprising a source region 13 and a drain region 15; an insulating layer 23 arranged on the substrate; and a porous body 25 which has pillar-shaped holes arranged on the insulating layer, wherein the insulating layer 23 is positioned between the substrate 11 and the porous body 25 (see col. 3, line 51 – col. 4, line 29; figure 1).



Regarding claim 3, Choi teaches that the porous layer 25 is comprised of an insulating material comprising aluminum oxide (see col. 4, lines 16 – 29).

Regarding claim 7, Choi teaches the incorporation of a material 26 comprising silicon, silicon nitride and metal disposed on the surface of the pillar-shaped holes as a quantum dot 27 for essentially functioning to detect and store electronic charge (see, e.g., col. 4, lines 5 – 60).

Regarding claim 10, this claim is considered an intended use claim. Since the prior art teaches all of the positively recited structure of the claimed device, it is considered to be capable of being used in the intended manner (see MPEP § 2114).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi in view of Fukutani et al. (U.S. Pat. No. 7,074,480 B2) (hereinafter "Fukutani").

Regarding claim 4, Fukutani teaches a porous body comprising a plurality of pillar-shaped pores suitable for use and incorporation in various types of devices where this type of porous body structure is desired (see, e.g., Abstract; col. 43, lines 1 – 11) (see MPEP § 2144.07). Fukutani teaches that the porous body comprises silicon, germanium or a combination of these materials (see, e.g., col. 1, lines 40 – 59). Fukutani also teaches an oxide porous body comprising silicon oxide (see, e.g., col. 11, lines 55 – 62). Furthermore, the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.07). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate the use of these materials within the porous body structure as claimed with the disclosed device.

2. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi in view of Webb et al. (U.S. Pat. No. 5,004,700) (hereinafter "Webb") and Hijikihigawa et al. (U.S. Pat. No. 5,140,393 A) (hereinafter "Hij.").

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Regarding claims 7 and 8, as discussed above, Choi teaches the field effect transistor structure as claimed. However, Choi does not specifically teach the use of the disclosed field effect transistor as a sensing device as intended. Webb teaches a sensing device comprising a similar field effect transistor (see, e.g., Abstract). Consequently, as shown by Webb, a person of ordinary skill in the art would accordingly have recognized the suitability of using the disclosed field effect transistor device as a component of a sensing device (see MPEP § 2144.07). Furthermore, as shown by Webb, a person of ordinary skill in the art would have had a reasonable expectation for success of incorporating the use of a field effect transistor device as a component of a sensing device (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate the use of the disclosed field effect transistor as a component of a sensing device as claimed.

As shown by Hij., the use of field effect transistor (FET) devices in biosensing applications is well known in the art (see, e.g., Hij.; col. 6, line 25 – col. 7, line 33) (see MPEP § 2144.03). Hij. teaches the use of a biomaterial, glucose oxidase, as a detection material (see col. 7, lines 10 – 33). Thus, a person of ordinary skill in the art would accordingly have had a reasonable expectation for success in incorporating the use of a biomaterial as a detecting material in field effect transistor-based sensing device (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate the use of a biomaterial as a detection material in an field effect transistr-based sensing device as claimed.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi in view of Webb.

Regarding claim 10, as discussed above, Choi teaches the field effect transistor structure as claimed. However, Choi does not specifically teach the use of the disclosed field effect transistor as a sensing device as claimed. Webb teaches a sensing device comprising a similar field effect transistor (see, e.g., Abstract). Consequently, as shown by Webb, a person of ordinary skill in the art would accordingly have recognized the suitability of using the disclosed field effect transistor device as a component of a sensing device (see MPEP § 2144.07). Furthermore, as shown by Webb, a person of ordinary skill in the art would have had a reasonable expectation for success of incorporating the use of a field effect transistor device as a component of a sensing device (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate the use of the disclosed field effect transistor as a component of a sensing device as claimed. It should be noted that claim 10 provides no further structural limitations of the claimed sensor. Thus, the cited prior art is considered to meet all of the structural limitations of the claimed invention.

#### ***Response to Arguments***

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

#### ***Allowable Subject Matter***

Claims 6 and 9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:



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Regarding claim 6, the cited prior art, in particular Choi and Fukutani, do not appear to fairly teach or suggest the specified mean pore density for the porous body.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

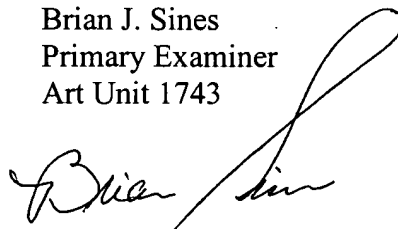
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian J. Sines  
Primary Examiner  
Art Unit 1743

A handwritten signature in black ink, appearing to read "Brian Sines", is written over the printed name and title.